

**Federal Highway Administration
Central Federal Lands Highway Division**

**Materials Sampling, Field Testing
and Laboratory Testing Plan**

*Strategic Highway Research Program
SPS-8 Experimental Project*

Utah Forest Highway and Federal Lands Highway Project 5-2(3)

**State Highway 35 (Wolf Creek Road)
Wasatch County, Utah**

FINAL

Prepared by:

**Nichols Consulting Engineers, Chtd.
SHRP Western Region Office
1885 S. Arlington Ave., Suite 111
Reno, Nevada 89509**

April 1996

Table of Contents

	Page
List of Tables	ii
List of Figures	iv
Background	1
Sampling and Testing Quantities	1
Sampling and Testing of SPS-8 Test Sections	5
Referenced Documents	6
Test Section Layout	6
Overview of Sampling and Testing	10
Natural Subgrade	12
<i>Thin-Wall (Shelby) Tube Samples</i>	12
<i>Bulk Samples</i>	12
<i>Density and Moisture Measurements</i>	13
Prepared Embankment	18
<i>Bulk Samples</i>	18
<i>Density and Moisture Measurements</i>	18
<i>Splitspoon Samples</i>	18
Dense Graded Aggregate Base	24
<i>Bulk Samples</i>	24
<i>Density and Moisture Measurements</i>	24
Asphalt Concrete Surface	28
<i>Bulk Samples</i>	28
<i>Cores</i>	29
<i>Density Measurements</i>	29
Elevation Measurements	34
Shipping Tracking Tables	36
Laboratory Tracking of Samples	40
Data Forms	51

List of Tables

	<u>Page</u>
Table 1. Estimated quantities of laboratory materials testing for the SPS-8 experimental project, S.R. 35, Utah	2
Table 2. Estimated quantities for material sampling and other field tests on SPS-8 project, S.R. 35, Utah	4
Table 3. Location of SPS-8 test sections, S.R. 35, Utah.	9
Table 4. Test section location table showing construction and project stations.	9
Table 5. Field and laboratory test plan for Natural Subgrade materials, SPS-8, S.R. 35, Utah.	14
Table 6. Locations for thin wall (Shelby) tube sampling of Natural Subgrade , SPS-8, Utah.	15
Table 7. Locations of Matural Subgrade bulk sampling, SPS-8 Utah.	16
Table 8. Locations for in-place density and moisture tests on Natural Subgrade , SPS-8 Utah.	17
Table 9. Field and laboratory test plan for Prepared Embankment materials, SPS-8 Utah	20
Table 10. Locations for prepared Embankment bulk sampling, SPS-8 Utah	21
Table 11. Locations for in-place density and moisture tests on Prepared Embankment , SPS-8 Utah	22
Table 12. Location of 20' deep splitspoon sampling, SPS-8 Utah	23
Table 13. Field and laboratory test plan for Dense Graded Aggregate Base materials, SPS-8 Utah	25
Table 14. Bulk sampling of uncompacted Dense Graded Aggregate Base , SPS-8 Utah ..	26
Table 15. Locations for in-place moisture and density measurements on compacted Dense Graded Aggregate Base , SPS-8 Utah	27
Table 16. Field and laboratory test plan for Asphalt Concrete surface materials, SPS-8 Utah	30

Table 17. Asphalt Concrete core locations, SPS-8 Utah	32
Table 18. Locations for in-place density measurements on compacted Asphalt Concrete	33
Table 19. Elevation surveys locations, SPS-8 Utah	35
Table 20. Samples to be retained by the State Laboratory (or their designee) Laboratory	37
Table 21. Samples to be shipped to the FHWA-LTPP Testing Contractor Laboratory	38
Table 22. Tracking table of Asphalt Concrete testing in the State Laboratory	42
Table 23. Tracking table of Unbound Granular Base testing in the State Laboratory	43
Table 24. Tracking table of Prepared Embankment testing in the State laboratory	44
Table 25. Tracking table of Natural Subgrade testing in the State Laboratory	46
Table 26. Tracking table of Asphaltic Concrete testing in the FHWA-LTPP Testing Contractor Laboratory	47
Table 27. Tracking table of Unbound Granular Base testing in the FWHA-LTPP Testing Contractor Laboratory	48
Table 28. Tracking table of Prepared Embankment testing in the FHWA-LTPP Testing Contractor Laboratory	49
Table 29. Tracking table of Natural Subgrade testing in the FHWA-LTPP Testing Contractor Laboratory	50

List of Figures

Page

Figure 1. Layout of experimental test sections, Utah SPS-8 project, S.R. 35	8
Figure 2. Overview of sampling, testing and coring plan for Asphalt Concrete sections on SPS-8 Utah project.	11

**Materials Sampling, Field Testing and Laboratory Testing Plan
SPS-8 Experimental Project
Wolf Creek Rd. (S.R. 35) Project, Wasatch County, Utah**

This document presents a materials and sampling plan for the experimental Strategic Highway Research Program (SHRP) SPS-8 project planned for construction on the Wolf Creek Road Project, 20 miles east of Heber City in Wasatch County, Utah. The experimental test sections will be constructed in the eastbound direction of S.R. 35.

Background

The LTPP SPS-8 experiment entitled, "Strategic Pavement Studies of Environmental Effects In the Absence of Heavy Loads", consists of the construction of two test sections with asphalt concrete (AC) surface layers and base layers of varying thickness.

In the next portion of this document, tables of materials sampling, field tests and laboratory test quantities are presented. This is followed by a detailed presentation of the materials sampling, field testing and laboratory testing plan and requirements of the Utah SPS-8 project.

Sampling and Testing Quantities

The estimated quantities for materials sampling, field testing and laboratory testing for the SPS-8 experimental project are contained in Tables 1 and 2. It should be noted that the SHRP sampling and test procedures referenced in these tables and in other portions of this document must be followed in conducting this work. This includes completion and submission of all required data forms.

Table 1. Estimated qualities of laboratory materials testing for the SPS-8 experimental project, S.R. 35, Utah (cont'd).

	<u>SHRP TEST Designation</u>	<u>SHRP Protocol</u>	<u>No.</u>
ASPHALT CONCRETE SURFACE			
Core Examination/Thickness	AC01	P01	3
Bulk Specific Gravity	AC02	P02	3
Maximum Specific Gravity	AC03	P03	3
Asphalt Content (Extraction)	AC04	P04	3
Moisture Susceptibility	AC05	P05	3
Creep Compliance	AC06	Ship to FHWA Lab	1
Resilient Modulus	AC07	Ship to FHWA Lab	3
Indirect Tensile Strength	AC07	Ship to FHWA Lab	3
In-Place Density		SHRP-LTPP Method	6
EXTRACTED AGGREGATE			
Specific Gravity of Coarse Aggregate	AG01	P11	3
Specific Gravity of Fine Aggregate	AG02	P12	3
Type and Classification of Coarse Aggregate	AG03	P13	3
Type and Classification of Fine Aggregate	AG03	P13	3
Aggregate Gradation	AG04	P14	3
NAA Test for Fine Aggregate Particle Shape	AG05	P14A	3
NAA Test for Coarse Aggregate Particle Shape	AG06	P14B	3
ASPHALT CEMENT			
Abson Recover	AE01	P21	3
Penetration @ 50F, 77F, 90F	AE02	P22	3
Specific Gravity @ 60F	AE03	P23	3
Viscosity @ 77F	AE04	P24	3
Viscosity @ 140F, 275F	AE05	P25	3
ASPHALT CEMENT (FROM PLANT)			
Penetration @ 50F, 77F, 90F	AE02	P22	3
Specific Gravity @ 60F	AE03	P23	3
Viscosity @ 77F	AE04	P24	3
Viscosity @ 140F, 275F	AE05	P25	3

Sampling and Testing of SPS-8 Test Sections

Material sampling and testing on this project during construction includes the following measurements, tests and samples from the various construction stages:

Natural Subgrade

- Bulk sampling and thin-walled tube sampling of the prepared natural subgrade surface
- Moisture content sampling of the prepared natural subgrade surface
- Moisture and density tests on the prepared natural subgrade surface
- Base line elevation surveys on the surface of the prepared natural subgrade to use as a reference in determining layer thickness

Prepared Embankment

- Bulk sampling of the prepared embankment
- Moisture content sampling of the prepared embankment
- Moisture and density tests on the prepared embankment surface
- Continuous splitspoon sampling to a depth of 20 feet
- Baseline elevation surveys on the surface of the prepared embankment to use as a reference in determining layer thickness
- Falling Weight Deflectometer (FWD) testing, performed by LTPP Regional Contractor

Dense Graded Aggregate Base

- Bulk sampling of the uncompacted dense graded aggregate base (DGAB)
- Moisture content sampling of the prepared DGAB surface
- Moisture and density tests on the prepared DGAB
- Elevation measurements on the prepared DGAB surface
- Falling Weight Deflectometer (FWD) testing, performed by LTPP Regional Contractor

Asphalt Concrete Surface

- Bulk sampling of the Asphalt Concrete (AC) materials (mixture, cement and aggregate)
- Coring of the AC for laboratory testing
- Density tests on compacted AC
- Elevation measurements on the prepared AC surface

The details for these samples, tests and measurements are presented in subsequent portions of this document organized by layer type.

stationing, test section stationing, and LTPP reference project stations. Construction stations are the same as those shown on the construction plans. Test section stationing refers to the method LTPP uses to reference locations within and adjacent to the ends of individual test sections. The LTPP test section stations start with station 0+00 assigned to the beginning of the 500 foot monitoring portion of the test section, and station 5+00 at the end of the monitoring portion. The reference stationing system will be used by LTPP for future monitoring measurements.

In general, all sampling of compacted material should occur at the ends of the test section between the start of the test section and the start of the monitoring portion, or between the end of the monitoring portion and the end of the test section. The only samples and tests performed within the 500 feet monitoring portion are sampling of the natural subgrade material, elevation measurements and nuclear moisture-density tests.

Table 3. Location of SPS-8 test sections, S.R. 35, Utah.

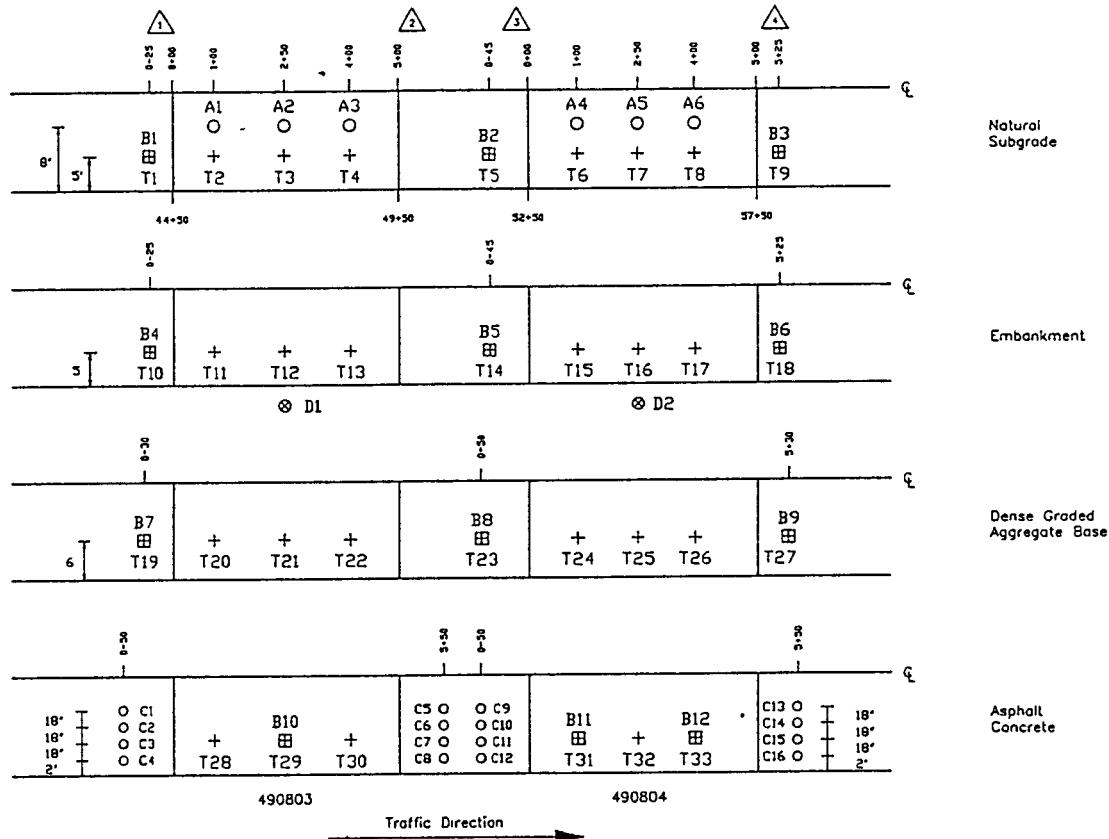
Section No.	Start Section	Start Monitor	End Monitor	End Section	Notes
490803	43+50	44+50	49+50	50+50	4"AC/8"DGAB
Trans	50+50			51+50	
490804	51+50	52+50	57+50	58+50	7"AC/12"DGAB

AC - Asphalt Concrete

DGAB - Dense Graded Aggregate Base

Table 4. Test section location table showing construction and project stations.

Test Section	Location	Construction Stationing	Test Section Stationing	SHRP Reference Project Station
490803	Begin	43+50	-1+00	
	Begin Monitoring	44+50	0+00	0+00
	End Monitoring	49+50	5+00	5+00
	End	50+50	6+00	6+00
490804	Begin	51+50	-1+00	7+00
	Begin Monitoring	52+50	0+00	8+00
	End Monitoring	57+50	5+00	13+00
	End	58+50	6+00	14+00



- ⊗ D1-D2 - 20' Splitspoon sampling
- A1-A6 - Thinwall tube samples of Natural Subgrade
- + T1-T9 - Moisture-density test on Natural Subgrade
- B1-B3 - Bulk samples of Natural Subgrade
- + T10-T18 - Moisture-density tests on Embankment (nuclear)
- B4-B6 - Bulk samples of Embankment
- + T19-T27 - Moisture-density test on DGAB (nuclear)
- B7-B9 - Bulk samples of DGAB
- + T28-T33 - Density tests on AC (nuclear)
- B10-B12 - Bulk samples of AC Mixture
- C1-C16 - 4" cores of AC surface
- △ Sampling Areas

Figure 2 Overview of sampling, testing and coring plan for Asphalt Concrete sections on SPS-8 Utah project

Density and Moisture Measurements

In-place density and moisture measurements should be performed on the natural subgrade surface at the locations specified in Table 8. These test shall be performed using a recently calibrated nuclear moisture-density gauges in accordance with the procedures in **AASHTO T238-86, Method B-Direct Transmission, AASHTO T239-86 and ASTM D2950-82**. Each measurement shall be the result of the average of four readings made during each 90° rotation of the nuclear gauge through a full 360°.

Table 6. Locations for thin-wall (Shelby) tube sampling of Natural Subgrade, SPS-8 Utah.

Sample Location Designation	Construction Stationing	Test Section Stationing	Offset, feet		Test Section
			Center Line, Rt	Outside Lane Edge, Lt	
A1	45+50	1+00	4	8	3
A2	47+00	2+50	4	8	3
A3	48+50	4+00	4	8	3
A4	53+50	1+00	4	8	4
A5	55+00	2+50	4	8	4
A6	56+50	4+00	4	8	4

Table 8. Locations for in-place density and moisture tests on Natural Subgrade, SPS-8 Utah.

Sample Location Designation	Construction Stationing	Test Section Stationing	Offset, feet		Test Section
			Center Line, Rt	Outside Lane Edge, Lt	
T1	44+25	0-25	7	5	3
T2	45+50	1+00	7	5	3
T3	47+00	2+50	7	5	3
T4	48+50	4+00	7	5	3
T5	52+10	0-40	7	5	4
T6	53+50	1+00	7	5	4
T7	55+00	2+50	7	5	4
T8	56+50	4+00	7	5	4
T9	57+75	5+25	7	5	4

auger with an inside diameter greater than 2.2 inches shall be used to obtain the splitspoon samples. Samples shall be done using only a 140 pound hammer, thirty inch drop and a sampler as specified in AASHTO T206, "Penetration Test and Split-barrel Sampling of Soils." Core retainers shall be used when necessary to retain soil. Care shall be exercised to provide a free fall of the hammer (minimum friction and straight pipe) and to minimize variations in drop height. It is essential that a clearly visible reference mark be identified on the splitspoon drop hammer rod so that the drop height is consistent. Blow counts and strata depths and field classifications shall be recorded on Sampling Data Sheet 4-2.

Table 10. Locations for prepared Embankment bulk sampling, SPS-8 Utah.

Sample Location Designation	Construction Stationing	Test Section Stationing	Offset, feet		Test Section	Sample Area
			Center Line, Rt	Outside Lane Edge, Lt		
B4	44+25	0-25	7	5	3	1
B5	52+05	0-45	7	5	4	3
B6	57+75	5+25	7	5	4	4

Table 12. Location of 20' deep splitspoon sampling, SPS-8 Utah.

Sample Location Designation	Construction Stationing	Test Section Stationing	Offset, feet		Test Section
			Center Line, Rt	Outside Lane Edge, Rt	
D1	47+00	2+50	18	6	3
D2	55+00	2+50	18	6	4

Table 13. Field and laboratory test plan for Dense Graded Aggregate Base materials, SPS-8 Utah.

Test Name	SHRP Test Designation	SHRP Protocol	Number of Tests	Material Source / Test Location
Particle Size Analysis	UG01	Ship to FHWA lab ¹	3	B7 - B9
Sieve Analysis (washed)	UG02	Ship to FHWA lab ¹	3	B7 - B9
Atterberg Limits	UG04	Ship to FHWA lab ¹	3	B7 - B9
Moisture-Density Relations	UG05	Ship to FHWA lab ¹	3	B7 - B9
Resilient Modulus	UG07	Ship to FHWA lab ¹	3	B7 - B9
Classification	UG08	Ship to FHWA lab ¹	3	B7 - B9
Permeability	UG09	P48	3	B7 - B9
Natural Moisture Content	UG10	Ship to FHWA lab ¹	3	B7 - B9
In-Place Density		SHRP-LTPP Method	9	T19 - T27

Note 1: Ship to FHWA lab after splitting and quartering a 100 pound sample for the state testing.

Table 15. Locations for in-place moisture and density measurements on compacted Dense Graded Aggregate Base, SPS-8 Utah.

Sample Location Designation	Construction Stationing	Test Section Stationing	Offset, feet		Test Section
			Center Line, Rt	Outside Lane Edge, Lt	
T10	44+20	0-30	6	6	3
T11	45+50	1+00	6	6	3
T12	47+00	2+50	6	6	3
T13	48+50	4+00	6	6	3
T14	52+00	0-50	6	6	4
T15	53+50	1+00	6	6	4
T16	55+00	2+50	6	6	4
T17	56+50	4+00	6	6	4
T18	57+80	5+30	6	6	4

Cores

Cores of the asphalt concrete shall have a 4" diameter. The core locations are listed in Table 17. The resilient modulus test, indirect tensile strength test, and creep compliance test will be performed by the FHWA-LTPP Testing Contractor Laboratory.

Care shall be taken to insure that all cores are obtained at a 90° angle to the pavement surface and that the edges are straight, intact, smooth and suitable for laboratory testing. Details on tolerance and quality control of coring operations are contained in Section 4 of the SHRP-LTPP Guide for Field Materials Sampling, Testing and Handling.

Care shall be taken to package all cores for transport and shipping in suitable containers to prevent damage or degradation of the core during transport.

Density Measurements

Nuclear density measurements shall be performed on top of the prepared AC at the location specified in Table 18. These measurements shall be performed following **AASHTO T238-86, Backscatter Method**. As with the unbound materials, each testing location shall have four readings with the density instrument rotated 90° between each reading.

Table 16. Field and laboratory test plan for Asphalt Concrete surface materials, SPS-8 Utah (cont'd).

Test Name	SHRP Test Designation	SHRP Protocol	Number of Tests	Material Source/Test Locations
Asphalt Cement samples (three 5-gallon pails)	Storage	Ship to MRL ¹	15 gallons	Mix Plant
Aggregate samples (one 55-gallon drum)	Storage	Ship to MRL ¹	500 pounds	Mix Plant
Bulk asphalt concrete Mixture samples (three 5-gallon pails)	Storage	Ship to MRL ¹	200 pounds	Roadway

Note 1: Containers and shipping will be provided by FHWA.

Table 18. Locations for in-place density measurements on compacted Asphalt Concrete.

Sample Location Designation	Construction Stationing	Test Section Stationing	Offset, feet		Test Section
			Center Line, Rt	Outside Lane Edge, Lt	
T28	45+50	1+00	6	6	3
T29	47+00	2+50	6	6	3
T30	48+50	4+00	6	6	3
T31	53+50	1+00	6	6	4
T32	55+00	2+50	6	6	4
T33	56+50	4+00	6	6	4

Table 19. Elevation surveys locations, SPS-8 Utah.

Sample Location Designation	Construction Stationing	Rt Offset, Center Line, feet					Lt Offset, Lane Edge, Feet					Test Section
		1	2	3	4	5	1	2	3	4	5	
E1	44+50	12	9	6	3	0	0	3	6	9	12	3
E2	45+00	12	9	6	3	0	0	3	6	9	12	3
E3	45+50	12	9	6	3	0	0	3	6	9	12	3
E4	46+00	12	9	6	3	0	0	3	6	9	12	3
E5	46+50	12	9	6	3	0	0	3	6	9	12	3
E6	47+00	12	9	6	3	0	0	3	6	9	12	3
E7	47+50	12	9	6	3	0	0	3	6	9	12	3
E8	48+00	12	9	6	3	0	0	3	6	9	12	3
E9	48+50	12	9	6	3	0	0	3	6	9	12	3
E10	49+00	12	9	6	3	0	0	3	6	9	12	3
E11	49+50	12	9	6	3	0	0	3	6	9	12	3
E12	52+50	12	9	6	3	0	0	3	6	9	12	4
E13	53+00	12	9	6	3	0	0	3	6	9	12	4
E14	53+50	12	9	6	3	0	0	3	6	9	12	4
E15	54+00	12	9	6	3	0	0	3	6	9	12	4
E16	54+50	12	9	6	3	0	0	3	6	9	12	4
E17	55+00	12	9	6	3	0	0	3	6	9	12	4
E18	55+50	12	9	6	3	0	0	3	6	9	12	4
E19	56+00	12	9	6	3	0	0	3	6	9	12	4
E20	56+50	12	9	6	3	0	0	3	6	9	12	4
E21	57+00	12	9	6	3	0	0	3	6	9	12	4
E22	57+50	12	9	6	3	0	0	3	6	9	12	4

Table 20. Samples to be retained by the State Laboratory (or their designee).

Sample Location Number	Sample Number	Lab Test Number	Type of Sample
Asphalt Concrete			
C10	CA10	1	4 in. Core
C11	CA11	1	4 in Core
C12	CA12	1	4 in. Core
B10	BA01	3	200 lb bulk sample
B11	BA02	3	200 lb bulk sample
B12	BA03	3	200 lb bulk sample
B13	BC04	3	5 gal bulk sample asphalt cement
B14	BC05	3	5 gal bulk sample asphalt cement
B15	BC06	3	5 gal bulk sample asphalt cement
Unbound Granular Base			
B7	BG04	1	400 lb bulk sample ¹
B8	BG05	1	400 lb bulk sample ¹
B9	BG06	2	400 lb bulk sample ¹
Embankment			
B4	BG01	1	400 lb bulk sample ¹
B5	BG02	1	400 lb bulk sample ¹
B6	BG03	2	400 lb bulk sample ¹
Natural Subgrade - If thin-wall tubes available			
B1	BS01	1	400 lb bulk sample ¹
B2	BS02	1	400 lb bulk sample ¹
B3	BS03	2	400 lb bulk sample ¹
A2	TS03	3	Thin-Wall Tube
A2	TS04	3	Thin-Wall Tube
A4	TS07	3	Thin-Wall Tube
A4	TS08	3	Thin-Wall Tube
A6	TS011	3	Thin-Wall Tube
A6	TS012	3	Thin-Wall Tube

Note 1: The bulk sample is to be shipped to the participating agency laboratory where it is to be split and quartered. A 300 lb portion of the bulk sample is then to be shipped to the FHWA-LTPP Testing Contractor Laboratory for further testing.

Table 21. Samples to be Shipped to FHWA-LTPP Testing Contractor Laboratory (cont'd).

Sample Location Number	Sample Number	Lab Test Number	Type of Sample
B6	MG03	2	Moisture Content Jar Sample
Natural Subgrade			
B1	BS01	1	300 lb Bulk Sample ¹
B2	BS02	1	300 lb Bulk Sample ¹
B3	BS03	2	300 lb Bulk Sample ¹
A1	TS01	3	Thin wall Tube Sample
A1	TS02	3	Thin wall Tube Sample
A3	TS05	3	Thin wall Tube Sample
A3	TS06	3	Thin wall Tube Sample
A5	TS09	3	Thin wall Tube Sample
A5	TS10	3	Thin wall Tube Sample
B1	MS01	1	Moisture Content Jar Sample
B2	MS02	1	Moisture Content Jar Sample
B3	MS03	2	Moisture Content Jar Sample

Note 1: The bulk sample shall be obtained from the participating agency.

- *Lab Test Number* - shall be assigned as per the following:
 - a. Beginning of the Section (Station 0-): samples of each layer that are retrieved from areas in the approach end of the test section (stations preceding 0+00) shall be assigned Laboratory Test Number '1'.
 - b. End of the Section (Stations 5+): samples of each layer that are retrieved from areas in the leave end of the test section (stations after 5+00) shall be assigned Laboratory Test Number '2'.
 - c. Middle of the Section (Stations 0+00 to 5+00): samples of each layer that are retrieved from areas in the middle of the test section (from the paver) shall be assigned Laboratory Test Number '3'.
- *Required Laboratory Tests Per Layer* - order in which testing shall proceed.
- *Extra Sample* - is the sample to be saved as a backup for other tests? A "yes" in this column implies that this is a dedicated extra sample saved for future use. A "no" indicates that a sample can be discarded after use.
- *Sample Storage* - the following codes are used to specify the sample storage conditions for samples:
 - a. environmentally protected and controlled storeroom at 5-21°C (40-70°F).
 - b. environmentally protected and controlled storeroom at 5-38°C (40-100°F).
 - c. Thin-walled tube samples of the subgrade that should be stored in a fully supported condition and at temperatures between 5°C (40°F) and 21°C (70°F) in an environmentally protected storeroom. They shall be stored on their ends and shall always be stored in a vertical position with respect to the longitudinal axis of the tube in the same orientation as that retrieved from the field.
- *Sample Disposal?* - indicates whether or not a sample can be disposed of after testing. Generally all samples, or portions of samples that are not tested are saved until further notice.

Tables 22 through 25 and Tables 26 through 29 should be completed (layer number), checked and modified as necessary to reflect the actual samples received and then submitted to Nichols Consulting Engineers for approval before any testing commences by the state testing lab and the FHWA-LTPP testing lab, respectively.

Table 23. Tracking Table of Unbound Granular Base Testing in the State Laboratory.

Layer Number (Note 1)	Layer Description Code	Layer Type	Test Section Number	Sample Location Number	Sample Number	Lab Test Number	Steps Involved in Laboratory Handling and Testing Sequence						
							Required Laboratory Tests Per Layer				Extra Sample	Sample Storage	Sample Disposed?
							First	Second	Third	Fourth			
	05	GB	03	B7	BG04	1	UG09/P48				No	(b)	Yes
	05	GB	04	B8	BG05	1	UG09/P48				No	(b)	Yes
	05	GB	04	B9	BG06	2	UG09/P48				No	(b)	Yes

Note 1: Layer Number to be completed by testing lab after reviewing field sampling logs.

Table 24. Tracking Table of Embankment Testing in the State Laboratory (cont'd).

Layer Number (Note 1)	Layer Description Code	Layer Type	Test Section Number	Sample Location Number	Sample Number	Lab Test Number	Steps Involved in Laboratory Handling and Testing Sequence						
							Required Laboratory Tests Per Layer				Extra Sample	Sample Storage	
							First	Second	Third	Fourth			
	06	GS	04	D2	JS16	3	SS12/P60				No	(b)	Yes
	06	GS	04	D2	JS17	3	SS12/P60				No	(b)	Yes
	06	GS	04	D2	JS18	3	SS12/P60				No	(b)	Yes
	06	GS	04	D2	JS19	3	SS12/P60				No	(b)	Yes
	06	GS	04	D2	JS20	3	SS12/P60				No	(b)	Yes

Note 1: Layer Number to be completed by testing lab after reviewing field sampling logs.

Table 26. Tracking Table of Asphaltic Concrete Testing in the FHWA-LTPP Testing Contractor Laboratory.

Layer Number (Note 1)	Layer Description Code	Layer Type	Test Section Number	Sample Location Number	Sample Number	Lab Test Number	Steps Involved in Laboratory Handling and Testing Sequence						
							Required Laboratory Tests Per Layer				Extra Sample	Sample Storage	
							First	Second	Third	Fourth			
	03	AC	03	C1	CA01	1	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)	No	(a)	Yes
	03	AC	03	C2	CA02	1	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)	No	(a)	Yes
	03	AC	03	C3	CA03	1	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)	No	(a)	Yes
	03	AC	03	C4	CA04	1	AC01/P01	AC02/P02	AC07/P07 (ITS)		No	(a)	Yes
	03	AC	03	C5	CA05	2	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)	No	(a)	Yes
	03	AC	03	C6	CA06	2	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)	No	(a)	Yes
	03	AC	03	C7	CA07	2	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)	No	(a)	Yes
	03	AC	03	C8	CA08	2	AC01/P01	AC02/P02	AC07/P07 (ITS)		No	(a)	Yes
	03	AC	04	C9	CA09	1	AC01/P01	AC02/P02	AC06/P06		No	(a)	Yes
	03	AC	04	C13	CA13	2	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)	No	(a)	Yes
	03	AC	04	C14	CA14	2	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)	No	(a)	Yes
	03	AC	04	C15	CA15	2	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)	No	(a)	Yes
	03	AC	04	C16	CA16	2	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)	No	(a)	Yes

Note 1: Layer Number to be completed by testing lab after reviewing field sampling logs.

Table 28. Tracking Table of Embankment Testing in the FHWA-LTPP Testing Contractor Laboratory.

Layer Number (Note 1)	Layer Description Code	Layer Type	Test Section Number	Sample Location Number	Sample Number	Lab Test Number	Steps Involved in Laboratory Handling and Testing Sequence								
							Required Laboratory Tests Per Layer						Extra Sample	Sample Storage	Sample Disposed?
							First	Second	Third	Fourth	Fifth	Sixth			
	06	GS	03	B4	BG01	1	SS01/P51	SS02/P42	SS03/P43	SS04/P52	SS05/P55	SS07/P46	No	(b)	Yes
	06	GS	04	B5	BG02	1	SS01/P51	SS02/P42	SS03/P43	SS04/P52	SS05/P55	SS07/P46	No	(b)	Yes
	06	GS	04	B6	BG03	2	SS01/P51	SS02/P42	SS03/P43	SS04/P52	SS05/P55	SS07/P46	No	(b)	Yes
	06	GS	03	B4	MG01	1	SS09/P49						No	(b)	Yes
	06	GS	04	B5	MG02	1	SS09/P49						No	(b)	Yes
	06	GS	04	B6	MG03	2	SS09/P49						No	(b)	Yes

Note: 1. Layer Number to be completed by testing lab after reviewing field sampling logs.

Data Forms

Data forms and instructions for all field sampling and measurements described in this document are contained in "Specific Pavement Studies, Materials Sampling and Testing Requirements for Experiment SPS-8, Study of Environmental Effects in the Absence of Heavy Loads". Copies of blank data forms are included in Appendix A, and SHRP-LTPP Data Collection standard codes are provided in Appendix B. These data forms must be completed at the time of the work. Completed forms shall be submitted to the designated LTPP representative.

APPENDIX A

SAMPLING DATA SHEETS, FIELD OPERATIONS INFORMATION FORMS
AND SPS-8 CONSTRUCTION DATA SHEETS

(Exclusively for SPS Experiments)

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING

SHEET NUMBER ____ OF ____

PAVEMENT CORE LOG AT C-TYPE CORE LOCATIONS

SAMPLING DATA SHEET 2

SHRP REGION _____ STATE _____ STATE CODE _____
 SPS EXPERIMENT NO _____ SPS PROJECT CODE _____
 ROUTE/HIGHWAY _____ Lane _____ Direction _____ TEST SECTION NO. _____
 SAMPLE/TEST LOCATION: Before Section After Section FIELD SET NO. _____
 OPERATOR _____ EQUIPMENT USED _____ CORING DATE _____
 CORE BARREL: Tip Type _____ Cooling Medium _____

Note: Record information for all cores extracted from each core hole in one column in the table below. Use a separate sheet for each test section. "Depth" should be measured from the pavement surface to the bottom of the core and recorded to the nearest tenth of an inch.

CORE HOLE NUMBER						
LOCATION: (a) STATION						
(b) OFFSET (Feet, O/S)						
Core Recovered?	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO
Replacement Core Hole No.						
Core Size (inch Diam.)	4	4	4	4	4	4
Core Sample No.						
Depth (Inches)						
Material Description						
Material Code						
Core Size (inch Diam.)	4	4	4	4	4	4
Core Sample No.						
Depth (Inches)						
Material Description						
Material Code						
Core Size (inch Diam.)	4	4	4	4	4	4
Core Sample No.						
Depth (Inches)						
Material Description						
Material Code						
Remarks						

GENERAL REMARKS: _____

CERTIFIED

VERIFIED AND APPROVED

DATE

Field Crew Chief
Affiliation: _____SHRP Representative
Affiliation: _____-19
Month - Day - Year

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING
 IN SITU DENSITY AND MOISTURE TESTS
 SAMPLING DATA SHEET 8

SHEET NUMBER _____ OF _____

SHRP REGION _____ STATE _____ STATE CODE _____
 SPS EXPERIMENT NO _____ SPS PROJECT CODE _____
 ROUTE/HIGHWAY _____ Lane _____ Direction _____ TEST SECTION NO. _____
 SAMPLE/TEST LOCATION: Before Section After Section FIELD SET NO.
 Within Section
 OPERATOR _____ NUCLEAR DENSITY GAUGE I.D. _____ TEST DATE _____
 LOCATION: STATION _____ OFFSET _____ feet from %/
 TEST PIT NO: _____ DATE OF LAST MAJOR CALIBRATION _____
 Note: Use additional sheets if necessary

DEPTH FROM SURFACE TO THE TOP OF THE LAYER, INCHES (From plans)						
LAYER DESCRIPTION						
MATERIAL TYPE: (Unbound-G Other-T)						
IN SITU DENSITY,pcf	1					
	2					
	3					
(AASHTO T238-86)	4					
AVERAGE						
Method (A,B,or C)						
Rod Depth, inches						
IN SITU MOISTURE CONTENT, %	1					
	2					
	3					
(AASHTO T239-86)	4					
AVERAGE						

GENERAL REMARKS: _____

CERTIFIED
 Field Crew Chief
 Affiliation: _____

VERIFIED AND APPROVED
 SHRP Representative
 Affiliation: _____

DATE
 Month- Day- Year
 - - - - - 19

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING
SAMPLING UNCOMPACTED BITUMINOUS PAVING MIXTURES
SAMPLING DATA SHEET 10

SHEET NUMBER _____ OF _____

SHRP REGION _____ STATE _____ STATE CODE _____
SPS EXPERIMENT NUMBER _____ SPS PROJECT CODE _____
ROUTE/HIGHWAY _____ Lane _____ Direction _____ TEST SECTION NO. _____
FIELD SET NO. _____

PERSON PERFORMING SAMPLING

NAME _____ EMPLOYER _____
TITLE _____

MIX PLANT

PLANT NAME _____

PLANT LOCATION _____

PLANT TYPE Batch..... 1 Drum..... 2 Other (Specify)..... 3

DESCRIPTION OF MIX PLANT _____

MANUFACTURER OF ASPHALT PLANT _____

MODEL NUMBER _____

BATCH SIZE _____

SAMPLING LOCATION

Conveyor Belt..... 1 Stockpile..... 2 Haul Truck..... 3 Funnel Device..... 4
Roadway Prior to Compaction 5 Station ____ + ____ Offset ____ (feet from O/S)
Other..... 6 (specify) _____

MIX TYPE "Virgin" Asphalt Concrete 1 Recycled Asphalt Concrete..... 2

LAYER TYPE

Rut Level-Up..... 1 Mill Replacement..... 2 Binder Course..... 3
Surface Course..... 4 Surface Friction Layer..... 5

SAMPLE TYPE DESIGNATION _____

SAMPLE NUMBER _____

APPROXIMATE SAMPLE SIZE (lbs)

DATE SAMPLED (Month - Day - Year)

LOCATION SAMPLE SHIPPED TO _____

DATE SHIPPED (Month-Day-Year)

GENERAL REMARKS: _____

CERTIFIED _____ VERIFIED AND APPROVED _____ DATE _____

Field Crew Chief _____ SHRP Representative _____ 19
Affiliation: _____ Affiliation: _____ Month- Day- Yr

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING
LABORATORY SHIPMENT SAMPLES INVENTORY
FIELD OPERATIONS INFORMATION, FORM 1
FOR EXPERIMENT SPS-1

SHEET NUMBER OF

STATE CODE —
SPS PROJECT CODE —
TEST SECTION NO. —
FIELD SET NO. —

FIELD WORK COMPLETED ON - - -

Note: Use additional sheets if necessary. Include summary information (Field Operations Information Form 2) and "as actual" sampling location plan sheets with this material samples inventory.

* Enter number of laboratory, as specified below, each sample was sent to:

Lab No.(1) _____
Lab No.(2) _____
Lab No.(3) _____

GENERAL REMARKS: _____

CERTIFIED

Field Crew Chief
Affiliation:

VERIFIED AND APPROVED

SHRP Representative _____
Affiliation: _____

DATE - - 19
Month- Day- Y.

SPS-8 CONSTRUCTION DATA SHEET 1 PROJECT IDENTIFICATION	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]
--	--

- *1. DATE OF DATA COLLECTION OR UPDATE (Month/Year) [__ __/__ __]
- *2. STATE HIGHWAY AGENCY (SHA) DISTRICT NUMBER [__ __.]
- *3. COUNTY OR PARISH [__ __ __.]
4. FUNCTIONAL CLASS (SEE TABLE A.2, APPENDIX A) [__ __.]
- *5. ROUTE SIGNING (NUMERIC CODE) [__ .]
Interstate... 1 U.S.... 2 State... 3
Other... 4
- *6. ROUTE NUMBER [__ __ __ __ __.]
7. TYPE OF PAVEMENT (01 for Granular Base, 02 for Treated Base) [__ __.]
8. NUMBER OF THROUGH LANES (ONE DIRECTION) [__.]
- *9. DATE OF CONSTRUCTION COMPLETION (Month/Year) [__ __/__ __]
- *10. DATE OPENED TO TRAFFIC (Month/Year) [__ __/__ __]
11. CONSTRUCTION COSTS PER LANE MILE (In \$1000) [__ __ __ __ __.]
12. DIRECTION OF TRAVEL [__ .]
East Bound... 1 West Bound... 2 North Bound... 3
South Bound... 4
- PROJECT STARTING POINT LOCATION
- *13. MILEPOINT [__ __ __. __ __]
- *14. ELEVATION [__ __ __ __]
- *15. LATITUDE [__ __ ° __ __ ' __ __ . __ __ "]
- *16. LONGITUDE [__ __ __ ° __ __ ' __ __ . __ __ "]
17. ADDITIONAL LOCATION INFORMATION (SIGNIFICANT LANDMARKS): [_____

_____]
18. HPMS SAMPLE NUMBER (HPMS ITEM 28) [__ __ __ __ __ __ __ __ __ __]
19. HPMS SECTION SUBDIVISION (HPMS ITEM 29) [__ .]

ORDER	*1 TEST SECTION ID NO	REFERENCE PROJECT STATION NUMBER			*4 CUT-FILL ¹	
		*2 START	*3 END		TYPE	STATION
1		0 + 0 0		+		+
2		+ - -		+		+
3		+ - -		+		+
4		+ - -		+		+
5		+ - -		+		+
6		+ - -		+		+
7		+ - -		+		+
8		+ - -		+		+
9		+ - -		+		+
10		+ - -		+		+
11		+ - -		+		+
12		+ - -		+		+
13		+ - -		+		+
14		+ - -		+		+
15		+ - -		+		+
16		+ - -		+		+
17		+ - -		+		+
18		+ - -		+		+
19		+ - -		+		+
20		+ - -		+		+

*5 INTERSECTIONS BETWEEN TEST SECTION ON THE PROJECT RAMPS |---INTERSECTION---|
ROUTE PROJECT STATION NO. EXIT ENT STOP SIGNAL UNSIG

— — — — + — — — — — — — — — — —

Note 1. Indicate the type of subgrade section the test section is located on:

Cut.... 1 Fill..... 2 At-Grade..... 3 Cut and Fill..... 4

If cut-fill transition is located in a test section, enter test section station of the cut-fill transition location.

SPS-8 CONSTRUCTION DATA SHEET 5 PLANT-MIXED ASPHALT BOUND LAYERS AGGREGATE PROPERTIES	* STATE CODE <input type="text"/> * SPS PROJECT CODE <input type="text"/> * TEST SECTION NO. <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
--	---

*1. LAYER NUMBER (FROM SHEET 4)

COMPOSITION OF COARSE AGGREGATE TYPE PERCENT

*2. Crushed Stone... 1 Gravel... 2 Crushed Gravel... 3

*3. Crushed Slag... 4 Manufactured Lightweight... 5

*4. Other (Specify)... 6

COMPOSITION OF FINE AGGREGATE TYPE PERCENT

*5. Natural Sand... 1

*6. Crushed or Manufactured Sand (From Crushed Gravel or

*7. Stone... 2 Recycled Concrete... 3
Other (Specify)... 4

*8. TYPE OF MINERAL FILLER

Stone Dust... 1 Hydrated Lime... 2 Portland Cement... 3

Fly Ash... 4

Other (Specify)... 5

BULK SPECIFIC GRAVITIES:

*9. Coarse Aggregate (AASHTO T85 or ASTM C127)

*10. Fine Aggregate (AASHTO T84 or ASTM C128)

*11. Mineral Filler (AASHTO T100 or ASTM D854)

*12. Aggregate Combination (Calculated)

13. Effective Specific Gravity of Aggregate Combination (Calculated)

AGGREGATE DURABILITY TEST RESULTS

(SEE DURABILITY TEST TYPE CODES, TABLE A.13)

TYPE OF AGGREGATE TYPE OF TEST RESULTS

14. Coarse

15. Coarse

16. Coarse

17. Coarse and Fine - Combined

18. POLISH VALUE OF COARSE AGGREGATES
SURFACE LAYER ONLY (AASHTO T279, ASTM D3319)

SPS-8 CONSTRUCTION DATA SHEET 7 PLANT-MIXED ASPHALT BOUND LAYERS MIXTURE PROPERTIES	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]
--	--

- *1. LAYER NUMBER (FROM SHEET 4) [__]
- *2. TYPE OF SAMPLES
 SAMPLES COMPACTED IN LABORATORY... 1
 SAMPLES TAKEN FROM TEST SECTION... 2
- *3. MAXIMUM SPECIFIC GRAVITY (NO AIR VOIDS)
 (AASHTO T209 OR ASTM D2041) [__.____]
- BULK SPECIFIC GRAVITY (ASTM D1188)
- *4. MEAN [__.____] NUMBER OF TESTS [__.__.]
5. MINIMUM [__.____] MAXIMUM [__.____]
6. STD. DEV. [__.____]
- ASPHALT CONTENT (PERCENT WEIGHT OF TOTAL MIX)
 (AASHTO T164 OR ASTM D2172)
- *7. MEAN [__.____] NUMBER OF SAMPLES [__.__.]
8. MINIMUM [__.____] MAXIMUM [__.____]
9. STD. DEV. [__.____]
- PERCENT AIR Voids
- *10. MEAN [__.____] NUMBER OF SAMPLES [__.__.]
11. MINIMUM [__.____] MAXIMUM [__.____]
12. STD. DEV. [__.____]
- *13. VOIDS IN MINERAL AGGREGATE (PERCENT) [__.__.]
- *14. EFFECTIVE ASPHALT CONTENT (PERCENT) [__.__.]
- *15. MARSHALL STABILITY (LBS) (AASHTO T245 OR ASTM D1559) [__.____.]
- *16. NUMBER OF BLOWS [__.__.]
- *17. MARSHALL FLOW (HUNDREDTHS OF AN INCH)
 (AASHTO T245 OR ASTM D1559) [__.____.]
- *18. HVEEM STABILITY (AASHTO T246 OR ASTM D1561) [__.____.]
- *19. HVEEM COHESIOMETER VALUE (GRAMS/25 MM OF WIDTH)
 (AASHTO T246 OR ASTM 1561) [__.____.]

SPS-8 CONSTRUCTION DATA SHEET 9 PLANT-MIXED ASPHALT BOUND LAYERS PLACEMENT DATA	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]
--	--

- *1. DATE PAVING OPERATIONS BEGAN (Month-Day-Year) [__ __ - __ __ - __ __]
- *2. DATE PAVING OPERATIONS COMPLETED (Month-Day-Year) [__ __ - __ __ - __ __]
- *3. ASPHALT CONCRETE PLANT AND HAUL
- | Type | Name | Haul Distance (Mi) | Time (Min) | Layer Numbers |
|-------------|---|--------------------|------------|----------------|
| Plant 1 | [__] _____ | [__ __ __] | [__ __] | [__] [__] [__] |
| Plant 2 | [__] _____ | [__ __ __] | [__ __] | [__] [__] [__] |
| Plant 3 | [__] _____ | [__ __ __] | [__ __] | [__] [__] [__] |
| Plant Type: | Batch..... 1 Drum Mix.... 2 Other...3 | Specify _____ | | |
4. MANUFACTURER OF ASPHALT CONCRETE PAVER _____
5. MODEL DESIGNATION OF ASPHALT CONCRETE PAVER _____
6. SINGLE PASS LAYDOWN WIDTH (Feet) [__ __ . __]
7. AC BINDER COURSE LIFT
- Layer Number _____ [__ __]
- Nominal First Lift Placement Thickness (Inches) [__ . __]
- Nominal Second Lift Placement Thickness (Inches) [__ . __]
8. AC SURFACE COURSE LIFT
- Layer Number _____ [__ __]
- Nominal First Lift Placement Thickness (Inches) [__ . __]
- Nominal Second Lift Placement Thickness (Inches) [__ . __]
9. SURFACE FRICTION COURSE (If Placed)
- Layer Number _____ [__ __]
- Nominal Placement Thickness (Inches) [__ . __]
10. TEST SECTION STATION OF TRANSVERSE JOINTS (within test section)
- Binder Course _____ [__ + __ __]
- Surface Course _____ [__ + __ __]
- Surface Friction Course _____ [__ + __ __]
11. LOCATION OF LONGITUDINAL SURFACE JOINT [__]
- Between lanes.. 1 Within lane.. 2
 (specify offset from O/S feet) [__ __ . __]
12. SIGNIFICANT EVENTS DURING CONSTRUCTION (disruptions, rain, equip. problems, etc.) _____

SPS-8 CONSTRUCTION DATA SHEET 11 PLANT-MIXED ASPHALT BOUND LAYERS DENSITY AND PROFILE DATA		* STATE CODE [] * SPS PROJECT CODE [] * TEST SECTION NO. []
---	--	---

1. NUCLEAR DENSITY MEASUREMENTS

LAYER TYPE	Binder Course	Surface Course	Surface Friction Layer
Measurement Method (A, B, C) ¹	—	—	—
Number of Measurement	— —	— —	— —
Average (pcf)	— — — . —	— — — . —	— — — . —
Maximum (pcf)	— — — . —	— — — . —	— — — . —
Minimum (pcf)	— — — . —	— — — . —	— — — . —
Standard Deviation (pcf)	— — — . —	— — — . —	— — — . —
Layer Number	— —	— —	— —

¹ Measurement Method Backscatter... A Direct Transmission... B Air Gap... C

2. MANUFACTURER OF NUCLEAR DENSITY GAUGE _____

3. NUCLEAR DENSITY GAUGE MODEL NUMBER _____

4. NUCLEAR DENSITY GAUGE IDENTIFICATION NUMBER _____

5. NUCLEAR GAUGE COUNT RATE FOR STANDARDIZATION _____

6. PROFILOGRAPH MEASUREMENTS

Profilograph Type California... 1 Rainhart... 2 _____

Profile Index (Inches/Mile) _____

Interpretation Method Manual.. 1 Mechanical.. 2 Computer.. 3 _____

Height of Blanking Band (Inches) _____

Cutoff Height (Inches) _____

7. SURFACE PROFILE USED AS BASIS OF INCENTIVE PAYMENT? (YES, NO) _____

SPS-8 CONSTRUCTION DATA SHEET 13 UNBOUND AGGREGATE BASE MATERIAL PLACEMENT	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]
--	--

*1. UNBOUND BASE MATERIAL PLACEMENT BEGAN (Month-Day-Year) [__ __ - __ __ - __ __]

*2. UNBOUND BASE MATERIAL PLACEMENT COMPLETED (Month-Day-Year) [__ __ - __ __ - __ __]

*3. LAYER NUMBER (From Sheet 4) [__]

PRIMARY COMPACTION EQUIPMENT

*4. CODE TYPE [__]

COMPACTION TYPE CODES

Pneumatic - Tired... 1 Steel Wheel Tandem... 2 Single Drum Vibr.... 3

Double Drum Vibr.... 4

Other (Specify)... 5 _____

*5. GROSS WEIGHT (TONS) [__ __.__]

*6. LIFT THICKNESSES

Nominal First Lift Placement Thickness (inches)

[__ __]

Nominal Second Lift Placement Thickness (inches)

[__ __]

Nominal Third Lift Placement Thickness (inches)

[__ __]

Nominal Fourth Lift Placement Thickness (inches)

[__ __]

DENSITY DATA IS RECORDED ON SAMPLING DATA SHEET 8-1

7. SIGNIFICANT EVENTS DURING CONSTRUCTION (DISRUPTIONS, RAIN, EQUIPMENT PROBLEMS, ETC.) _____

SPS-8 CONSTRUCTION DATA SHEET 15 CUT-FILL SECTION LOCATIONS			* STATE CODE [] * SPS PROJECT CODE [] * TEST SECTION NO. []
---	--	--	---

ORDER	*1 CUT-FILL ¹	REFERENCE PROJECT STATION NUMBER		*4 TEST SECTION NO
		*2 START	*3 END	
1		0 + 0 0	----- +	-----
2		+ -----	----- +	-----
3		+ -----	----- +	-----
4		+ -----	----- +	-----
5		+ -----	----- +	-----
6		+ -----	----- +	-----
7		+ -----	----- +	-----
8		+ -----	----- +	-----
9		+ -----	----- +	-----
10		+ -----	----- +	-----
11		+ -----	----- +	-----
12		+ -----	----- +	-----
13		+ -----	----- +	-----
14		+ -----	----- +	-----
15		+ -----	----- +	-----
16		+ -----	----- +	-----
17		+ -----	----- +	-----
18		+ -----	----- +	-----
19		+ -----	----- +	-----
20		+ -----	----- +	-----
21		+ -----	----- +	-----
22		+ -----	----- +	-----
23		+ -----	----- +	-----
24		+ -----	----- +	-----
25		+ -----	----- +	-----

- NOTES:
1. Indicate the type of subgrade section with one of the following:
Cut... 1 Fill... 2
 2. A given Test Section No. will be repeated if both cut and fill sections exist within the test section.

SPS-8 CONSTRUCTION DATA SHEET 28 MISCELLANEOUS CONSTRUCTION NOTES AND COMMENTS	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]
--	--

Provide any miscellaneous comments and notes concerning construction operations which may have an influence on the ultimate performance of the test sections or which may cause undesired performance differences to occur between test sections. Also include any quality control measurements or data for which space is not provided on other forms. Provide an indication of the basis for such measurements, such as an ASTM, AASHTO, or Agency standard test designation.

SPS-8 Data Collection Guidelines, September 1992

APPENDIX B

SHRP-LTPP DATA COLLECTION STANDARD CODES

(Reproduced from Appendix A of the SHRP-LTPP Data Collection Guide)

Revised August 30, 1989

APPENDIX A. STANDARD CODES

This appendix provides standard codes to simplify entry of data during collection and the subsequent storage and processing of this data. These codes are tabulated as follows:

Table A.1	Standard Codes for States, District of Columbia, Puerto Rico, American Protectorates, and Canadian Provinces
Table A.2	Functional Class Codes
Table A.3	Experiment Type Definitions for LTPP
Table A.4	Pavement Type Codes
Table A.5	Pavement Surface Material Type Classification Codes
Table A.6	Base and Subbase Material Type Classification Codes
Table A.7	Subgrade Soil Description Codes
Table A.8	Material Type Codes for Thin Seals and Interlayers
Table A.9	Geologic Classification Codes
Table A.10	Soil Type Codes, AASHTO Soil Classification
Table A.11	Portland Cement Type Codes
Table A.12	Portland Cement Concrete Admixture Codes
Table A.13	Aggregate Durability Test Type Codes
Table A.14	Asphalt Refiners and Processors in the United States
Table A.15	Asphalt Cement Modifier Codes
Table A.16	Grades of Asphalt, Emulsified Asphalt, and Cutback Asphalt Codes
Table A.17	Maintenance and Rehabilitation Work Type Codes
Table A.18	Maintenance Location Codes
Table A.19	Maintenance Materials Type Codes
Table A.20	Recycling Agent Type Codes
Table A.21	Anti-Stripping Agent Type Codes
Table A.22	Distress Types

Table A.2. Functional class codes.

<u>Functional Class</u>	<u>Code</u>
Rural:	
Principal Arterial - Interstate.....	01
Principal Arterial - Other.....	02
Minor Arterial.....	06
Major Collector.....	07
Minor Collector.....	08
Local Collector.....	09
Urban:	
Principal Arterial - Interstate.....	11
Principal Arterial - Other Freeways or Expressways.....	12
Other Principal Arterial.....	14
Minor Arterial.....	16
Collector.....	17
Local.....	19

Note: These codes are consistent with the HPMS system.

Revised June 13, 1988

Table A.3. Detailed Descriptions of Pavements for Each LTPP General Pavement Studies Experiment (Continued).

(07) AC OVERLAY OF JOINTED CONCRETE PAVEMENT

Acceptable pavements for this study include a dense-graded HMAC surface layer (1) with or without other HMAC layers (28) placed on either a JPCP (4), JRCP (5), or CRCP (6). The slab may rest on any combination of base and/or subbase layers indicated in Table A.6 (except 45). The previously existing concrete slab may also have been placed directly on lime or cement treated fine or coarse-grained subgrade (27, 42, and 43), or on untreated coarse-grained subgrade (57-65). Slabs placed directly on untreated fine-grained subgrade (51-56) are not acceptable. Seal coats or porous friction courses are permissible, but not in combination. Fabric interlayers (75 or 76) and SAMIs (77) are acceptable when placed between the original surface (concrete) and the overlay. Overlaid pavements with aggregate interlayers (79) and open-graded asphalt concrete (80) will not be considered in this study. The total thickness of HMAC used in the overlay must be at least 1.5 inches. Pavements which have been overlaid more than once since they were originally constructed are not acceptable. Pavements in both bad and good condition as measured by levels of specific distress types present prior to the overlay are needed.

(09) UNBONDED JCP OVERLAYS OF CONCRETE PAVEMENT

Acceptable projects for this study include unbonded JPCP (4), JRCP (5), or CRCP (6) overlay with a thickness of 5 inches or more placed over an existing JPCP (4), JRCP (5), or CRCP (6) pavement. The overlaid concrete pavement may rest on any of the base and subbase types listed in Table A.6 or directly upon subgrade.

Revised June 13, 1988

Table A.4 Pavement Type Codes
(Continued)

*Composite Pavements (Wearing Surface Included in Initial Construction):

JPCP With Asphalt Concrete Wearing Surface.....	51
JRCP With Asphalt Concrete Wearing Surface.....	52
CRCP With Asphalt Concrete Wearing Surface.....	53
Other.....	59

Definitions:

- JPCP - Jointed Plain Concrete Pavement
JRCP - Jointed Reinforced Concrete Pavement
CRCP - Continuously Reinforced Concrete Pavement

* "Composite Pavements" are pavements originally constructed with an asphalt concrete wearing surface over a portland cement concrete slab (1986 "AASHTO Guide for Design of Pavement Structures").

Revised June 13, 1988

Table A.6. Base and subbase material type classification codes.

	<u>Code</u>
No Base (Pavement Placed Directly on Subgrade).....	21
Gravel (Uncrushed).....	22
Crushed Stone, Gravel or Slag.....	23
Sand.....	24
Soil-Aggregate Mixture (Predominantly Fine-Grained Soil).25	
Soil-Aggregate Mixture (Predominantly Coarse-Grained Soil).....	26
Soil Cement.....	27
Asphalt Bound Base or subbase Materials	
Dense Graded, Hot Laid, Central Plant Mix.....	28
Dense Graded, Cold Laid, Central Plant Mix.....	29
Dense Graded, Cold Laid, Mixed In-Place.....	30
Open Graded, Hot Laid, Central Plant Mix.....	31
Open Graded, Cold Laid, Central Plant Mix.....	32
Open Graded, Cold Laid, Mixed In-Place.....	33
Recycled Asphalt Concrete, Plant Mix, Hot Laid.....	34
Recycled Asphalt Concrete, Plant Mix, Cold Laid.....	35
Recycled Asphalt Concrete, Mixed In-Place.....	36
Sand Asphalt.....	46
Cement-Aggregate Mixture.....	37
Lean Concrete (<3 sacks cement/cy).....	38
Recycled Portland Cement Concrete.....	39
Sand-Shell Mixture.....	40
Limerock, Caliche (Soft Carbonate Rock).....	41
Lime-Treated Subgrade Soil.....	42
Cement-Treated Subgrade Soil.....	43
Pozzolanic-Aggregate Mixture.....	44
Cracked and Seated PCC Layer.....	45
Other.....	49

Revised June 13, 1988

Table A.8. Material type codes for thin seals and interlayers.

	<u>Code</u>
Chip Seal Coat.....	71
Slurry Seal Coat.....	72
Fog Seal Coat.....	73
Woven Geotextile.....	74
Nonwoven Geotextile.....	75
Stress Absorbing Membrane Interlayer.....	77
Dense Graded Asphalt Concrete Interlayer.....	78
Aggregate Interlayer.....	79
Open Graded Asphalt Concrete Interlayer.....	80
Chip Seal With Modified Binder (Does Not Include Crumb Rubber).....	81
Sand Seal.....	82
Asphalt-Rubber Seal Coat (Stress Absorbing Membrane).....	83
Sand Asphalt.....	84
Other.....	85

Revised June 13, 1988

Table A.10. Soil and soil-aggregate mixture type codes,
AASHTO classification.

	<u>Code</u>
A-1-a.....	01
A-1-b.....	02
A-3.....	03
A-2-4.....	04
A-2-5.....	05
A-2-6.....	06
A-2-7.....	07
A-4.....	08
A-5.....	09
A-6.....	10
A-7-5.....	11
A-7-6.....	12

Revised June 13, 1988

Table A.12 Portland Cement Concrete Admixture Codes

	<u>Code</u>
Water-Reducing (AASHTO M194, Type A)	01
Retarding (AASHTO M194, Type B)	02
Accelerating (AASHTO M194, Type C)	03
Water-Reducing and Retarding (AASHTO M194, Type D)	04
Water-Reducing and Accelerating (AASHTO M194, Type E)	05
Water-Reducing, High Range (AASHTO M194, Type F)	06
Water-Reducing, High Range and Retarding (AASHTO M194, Type G) ...	07
Air-Entraining Admixture (AASHTO M154)	08
Natural Pozzolans (AASHTO M295, Class N)	09
Fly Ash, Class F (AASHTO M295)	10
Fly Ash, Class C (AASHTO M295)	11
Other (Chemical)	12
Other (Mineral)	13

Table A.14. Codes for Asphalt Refiners and Processors in the United States.*

	<u>Code</u>
Belcher Refining Co.--Mobile Bay, Alabama	78
Hunt Refining Company--Tuscaloosa, Alabama	01
Chevron USA, Inc.--Kenai, Alaska	02
Mapco Alaska Petroleum--North Pole, Alaska	03
Intermountain Refining Cl.--Fredonia, Arizona.....	04
Berry Petroleum Company--Stevens, Arkansas	05
Cross Oil and Refining Company--Smackover, Arkansas	06
Lion Oil Company--El Dorado, Arkansas	07
McMillan Ring, Free Oil Cl.--Norphlet, Arkansas	08
Chevron USA, Inc.--Richmond, California	09
Conoco, Inc.--Santa Maria, California	10
Edgington Oil Co., Inc.--Long Beach, California	11
Golden Bear Division, Witco Chemical Corp.--Oildale, California	12
Golden West Refining, Co.--Santa Fe Springs, California	13
Huntway Refining Co.--Benicia, California	14
Huntway Refining Co.--Wilmington, California	15
Lunday-Thagard Co.--South Gate, California	79
Newhall Refining Co., Inc.--Newhall, California	16
Oxnard Refining--Oxnard, California	17
Paramount Petroleum Corp.--Paramount, California	80
Powerline Oil Co.--Santa Fe Springs, California	81
San Joaquin Refining Cl.--Bakersfield, California	18
Shell Oil Co.--Martinez, California	19
Superior Processing Co.--Santa Fe Springs, California	20
Colorado Refining Co.--Commerce City, Colorado	82
Conoco, Inc.--Commerce City, Colorado	21
Amoco Oil Co.--Savannah, Georgia	22
Young Refining Corp.--Douglasville, Georgia	23
Chevron USA--Barber's Point, Hawaii	24
Clark Oil and Refining Corp.--Blue Island, Illinois	25
Shell Oil Co.--Wood River, Illinois	26
Unacol Corp.--Lemont, Illinois	27
Amoco Oil Co.-- Whiting, Indiana	28
Laketon Refining Corp.--Laketon, Indiana	83
Young Refining Corp.--Laketon, Indiana	29
Derby Refining Co.-- El Dorado, Kansas	84
Farmland Industries, Inc.--Phillipsburg, Kansas	30
Total Petroleum, Inc.--Arkansas City, Kansas	31
Ashland Petroleum Co.--Cynthiana, Kentucky	32
Atlas Processing Co.--Shreveport, Louisiana	33
Calumet Refining Co.--Princeton, Louisiana	34
Exxon Co.--Baton Rouge, Louisiana	35
Marathon Petroleum Co.--Garyville, Louisiana	36
Marathon Petroleum Co.--Detroit, Michigan	37
Ashland Petroleum Co.--St. Paul, Minnesota	38
Koch Refining Co.--Rosemount, Minnesota	39
Chevron USA, Inc.--Pascagoula, Mississippi	40
Ergon Refining Inc.--Vicksburg, Mississippi	41
Southland Oil Co.--Lumberton, Mississippi	42
Southland Oil Co.--Sanderson, Mississippi	43

Revised June 13, 1988

Table A.15 Asphalt Cement Modifier Codes

	<u>Code</u>
Stone Dust.....	01
Lime.....	02
Portland Cement.....	03
Carbon Black.....	04
Sulfur.....	05
Lignin.....	06
Natural Latex.....	07
Synthetic Latex.....	08
Block Copolymer.....	09
Reclaimed Rubber.....	10
Polyethylene.....	11
Polypropylene.....	12
Ethylene-Vinyl Acetate.....	13
Polyvinyl Chloride.....	14
Asbestos.....	15
Rock Wool.....	16
Polyester.....	17
Manganese.....	18
Other Mineral Salts.....	19
Lead Compounds.....	20
Carbon.....	21
Calcium Salts.....	22
Recycling Agents.....	23
Rejuvenating Oils.....	24
Amines.....	25
Fly Ash.....	26
Other.....	27

Table A.17 Maintenance and Rehabilitation Work Type Codes

	<u>Code</u>
Crack Sealing (linear ft.)	01
Transverse Joint Sealing (linear ft.)	02
Lane-Shoulder, Longitudinal Joint Sealing (linear ft.)	03
Full Depth Joint Repair Patching of PCC (sq. yards)	04
Full Depth Patching of PCC Pavement Other than at Joint (sq. yards)	05
Partial Depth Patching of PCC Pavement Other than at Joint (sq. yards)	06
PCC Slab Replacement (sq. yards)	07
PCC Shoulder Restoration (sq. yards)	08
PCC Shoulder Replacement (sq. yards)	09
AC Shoulder Restoration (sq. yards)	10
AC Shoulder Replacement (sq. yards)	11
Grinding/Milling Surface (sq. yards)	12
Grooving Surface (sq. yards)	13
Pressure Grout Subsealing (no. of holes)	14
Slab Jacking Depressions (no. of depressions)	15
Asphalt Subsealing (no. of holes)	16
Spreading of Sand or Aggregate (sq. yards)	17
Reconstruction (Removal and Replacement) (sq. yards)	18
Asphalt Concrete Overlay (sq. yards)	19
Portland Cement Concrete Overlay (sq. yards)	20
Mechanical Premix Patch (using motor grader and roller) (sq. yards)	21
Manual Premix Spot Patch (hand spreading and compacting with roller) (sq. yards)	22
Machine Premix Patch (placing premix with paver, compacting with roller) (sq. yards)	23
Full Depth Patch of AC Pavement (removing damaged material, repairing supporting material, and repairing) (sq. yards) ...	24
Patch Pot Holes - Hand Spread, Compacted with Truck (no. of holes)	25
Skin Patching (hand tools/hot pot to apply liquid asphalt and aggregate) (sq. yards)	26
Strip Patching (using spreader and distributor to apply hot liquid asphalt and aggregate) (sq. yards)	27
Surface Treatment, single layer (sq. yards)	28
Surface Treatment, double layer (sq. yards)	29
Surface Treatment, three or more layers (sq. yards)	30
Aggregate Seal Coat (sq. yards)	31
Sand Seal Coat (sq. yards)	32
Slurry Seal Coat (sq. yards)	33
Fog Seal Coat (sq. yards)	34
Prime Coat (sq. yards)	35
Tack Coat (sq. yards)	36
Dust Layering (sq. yards)	37
Longitudinal Subdrains (linear feet)	38
Transverse Subdrainage (linear feet)	39

Table A.18. Maintenance location codes.

	<u>Code</u>
Outside Lane (Number 1)	01
Inside Lane (Number 2)	02
Inside Lane (Number 3)	03
All Lanes	09
Shoulder	04
All Lanes Plus Shoulder	10
Curb and Gutter	05
Side Ditch	06
Culvert	07
Other	08

Note: SHRP LTPP only studies outside lanes.

Revised June 13, 1988

Table A.20. Recycling agent type codes.

	<u>Code</u>
RA 1.....	42
RA 5.....	43
RA 25.....	44
RA 75.....	45
RA 250.....	46
RA 500.....	47
Other.....	48

Note: The recycling agent groups shown in this table are defined in ASTM D4552.

Table A.22 Distress Types

	<u>Code</u>
Asphalt Concrete Pavement	
Alligator Cracking	01
Block Cracking	02
Edge Cracking	03
Longitudinal Cracking	04
Reflection Cracking	05
Transverse Cracking	06
Patch Deterioration	07
Potholes	08
Rutting	09
Shoving	10
Bleeding	11
Polished Aggregate	12
Raveling and Weathering	13
Lane Shoulder Dropoff	14
Water Bleeding	15
Pumping	16
Other	17
Portland Cement Concrete Pavement	
Corner Breaks	20
Durability Cracking	21
Longitudinal Cracking	22
Transverse Cracking	23
Joint Seal Damage	24
Spalling	25
Map Cracking/Scaling	26
Polished Aggregate	27
Popouts	28
Punchouts	29
Blowouts	30
Faulting	31
Lane/Shoulder Dropoff	32
Lane/Shoulder Separation	33
Patch Deterioration	34
Water Bleeding/Pumping	35
Slab Settlement	36
Slab Upheavel	37
Other	38